

Calderbank 19-6-42

encoder 52, and then to mapper and pulse shaper 53 and antennas 54 and 45.

Generalizing, information symbols from a transmitting terminal are split into  $L$  parallel streams. Stream  $l$  is then encoded using a channel code with rate  $R_l$  and then coded with a space-time block encoder with  $N$  transmitting antennas. The coding rates can be the same, but an advantage accrues when the coding rates are chosen such that

$R_1 < R_2 < \dots < R_L$ . In such a case, symbols transmitted in stream  $l$  will have better immunity against channel errors as compared to symbols transmitted in stream  $u$  where  $u > l$ . The base station receiver is assumed to be equipped with at least  $L$  receive antennas.

The base station receiver treats each stream as a different user and uses the iterative interference cancellation techniques disclosed above, or the ones disclosed in the aforementioned '163 application. Since the first stream has the smallest coding rate  $R_1$ , it has the best immunity against the channel errors and most likely it will be error free. The receiver then uses the decoded symbol of stream  $l$  to subtract the contributions of the first stream in the total received signals, while decoding the remaining  $L-l$  streams. In decoding the remaining  $L-l$  streams, the decoder decodes signals from the second stream first, since it has the best immunity against channel errors among the remaining  $L-l$  streams (due to its lowest rate,  $R_2$  from among the remaining streams). Then the receiver uses the decoded symbols for the second stream to cancel out its contribution in the received signal. This process is repeated until all streams are decoded.—.

IN THE CLAIMS (Entire set of claims):

3. A transmitter comprising:  
a demultiplexer responsive to an applied input signal for developing a plurality of at least two signal streams, and  
a like plurality of channel coding/space-time coding transmitters, each responsive to a different signal stream of said plurality of signal streams.

4. The transmitter of claim 3 where each of said channel coding/space-time coding transmitters comprises:  
a channel coder of rate  $R_l$ ,  
a space-time encoder responsive to output signal of said channel code encoder,